Hobbies WEEKLY

CONTENTS

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A LIGHT CAR TRAILER

THIS particular design of trailer is specially suitable for the conveyance of moderately light loads, being of strong construction though light in weight. For carrying the paraphernalia of camping apparatus it would prove useful. Construction is very simple, and the wheelwork, etc., can be put together easily enough, or bought ready-made if preferred.

Fig. 1 shows a side view of the trailer, and Fig. 2 an end view. From these the general dimensions of the vehicle can be taken. The wheelwork is of importance, however, and if the reader can purchase a second-hand chassis in good order, of course, it would be wise to see to that part first, as any amendments to the dimensions of the box body can then be noted to ensure the body fitting the bought chassis.

The Box Body

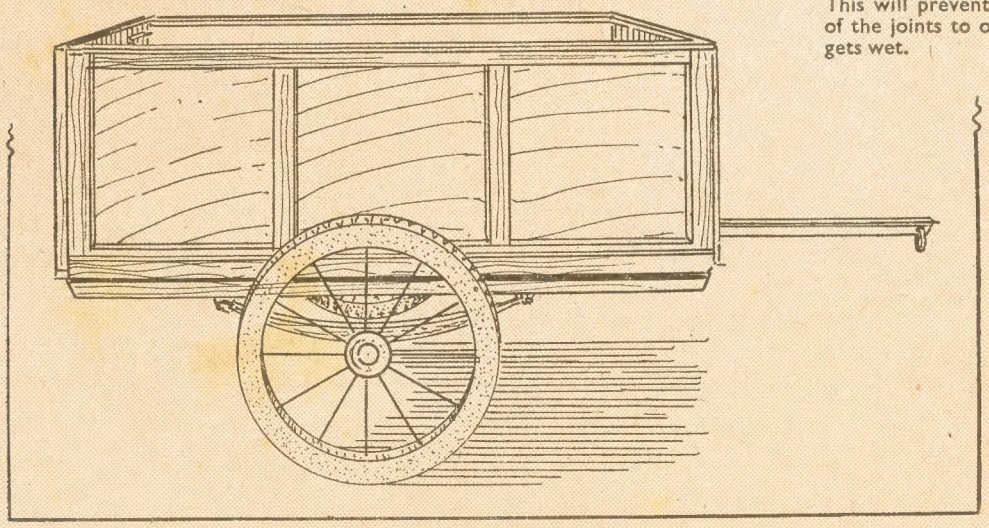
The box body is constructed in the same way as a box would be, hence its name, probably. It consists of two sides and ends, firmly nailed and screwed together, with a stout bottom or floor nailed on. For economy and lightness combined, the sides and ends are made as frames, covered with plywood.

For the frames use $\frac{7}{8}$in. by 2in. wood. Make up these to the sizes given (or amended as may be necessary), using mortise and tenon joints. These are not difficult to any woodworker, and make a far preferable appearance to the finished article than the common halved joints, though the latter are useful enough in their sphere.

For the corners cut the tenons with a shoulder to them, as at (B) in Fig. 1. When cutting out the accompanying mortises, it is as well to allow the wood to be 1in. longer than the proper length, and then to saw off the surplus after the joints are glued up. There is no danger then of splitting the wood at the ends. The vertical intermediate bars are also tenoned in, but in this case the tenons need not be deeper than $\frac{1}{2}$in., as at (C) Fig. 3.

Framework

Now glue up the frames, all four of them, and put aside for the glue to harden. The surplus, if any, at the ends can then be sawn off and the ends trimmed smooth. The corner tenon joints can be strengthened by driving a wire nail through them, to act as a pin. This will prevent any possible tendency of the joints to open at all, if the wood gets wet.



Screw the front end frame to the sides securely, either countersinking the screw heads, or employing round-headed screws. Preference can be given to the latter, they look less unsightly. Get a piece of wood (scrap) and nail this across the sides at the open ends to keep them at their correct distance apart, i.e., 3ft., until the floor of the body is fixed on.

For the floor, the most suitable wood

is tongued and grooved floor boarding. This is strong and will stand the wear and tear of loads being dragged across it quite well. Of course, other strong boarding can be used, but if square edged, the edges should be glued together during the course of nailing on.

Assembly

Starting from the front end, nail and screw the boards to the body. It will make a stronger fixing here if screws are mixed with the nails, say, a screw and a nail alternately. It will be as well to cut each piece of board to its correct length before nailing; it will save time later on.

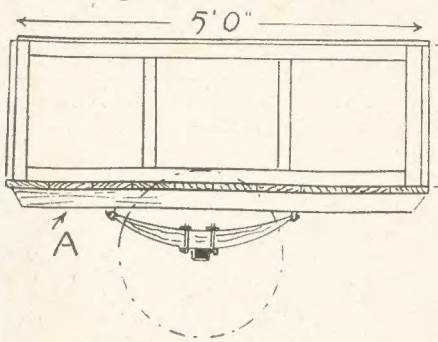


Fig. 1—Side view of body and spring

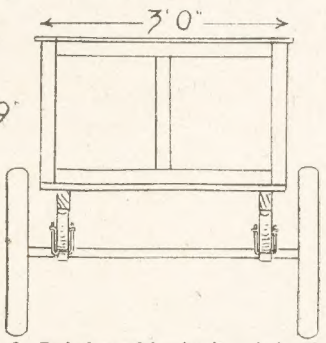


Fig. 2—End view with wheels and chassis

When all the boards are laid across, the scrap bit, previously fastened to keep the sides level, can be knocked off. Let the rear end of the boards extend beyond the body just $\frac{7}{8}$in. for the rear frame to rest upon.

With the smoothing plane make the cut edges of the floor level with the sides. Now cover the front and sides, on the inside of the body, with a strong plywood, or a good substantial substitute. There are several of these on the market. Choose the kind that can be sawn like wood, not those made of some pressed pulp material, which are quite unsuitable to this job.

Trim off the edges of the plywood to make them quite level with the top of the frames. Now prepare a few feet of wood to a section of $\frac{1}{2}$in. by $1\frac{1}{2}$in. and nail this to cover the top edges of both frames and plywood, all round, as in detail (D) Fig. 3. The outer edges of these pieces could be curved a little, and the meeting ends at the front made a neat fit to mitre together.

Rear Frame

Take the rear frame now. The plywood here is panelled in, not laid on. This can be neatly effected by first nailing a small bead round on the insides of the frames, then fitting the panels in the rebate thus formed, and keeping the latter in position with a planed slip, nailed behind, as at detail (E). A quite nice effect will result if the job is done with care.

To keep the rear frame in position, despite the inevitable shaking during travel, at the bottom some 6ins. in from each side, screw pieces of $\frac{1}{8}$in. by $\frac{3}{4}$in. iron bar, as shown at (F) in Fig. 4. These should extend beyond the bottom edges of the frame just the thickness of the flooring.

A pair of sockets, into which these irons can drop, are bent up from similar iron bar, and screwed to the back edge of the floor, as seen in Fig. 4, in the correct position, naturally.

Try the rear frame in place, and file up the irons, as may be necessary, for them to drop in fairly easily and not stick. To keep the frame closed up to the body, fit a cupboard bolt, one each side, on the inside. Bolts with a bent end are required, so the necessary holes for them to slip in can be bored in the sides of the body.

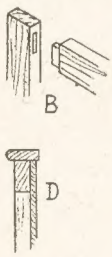


Fig. 3—Details of joints

Finish this part of the job by screwing an iron bracket each side, just behind the rear frame, to keep the sides of the body firm and erect at their open ends. Fig. 4 shows all the foregoing details.

Prepare two strips of deal to a section of $\frac{3}{8}$in. by 2ins. and as long as the body of the trailer. The top edges of these are bevelled off, then the strips are nailed along the sides of the body, at the bottom outside to cover the sawn edges of the floor, as at (G), and leave a neat finish at this part of the trailer.

As now made the body could be screwed to the complete chassis, if of the bought pattern, new or second-hand. With a made-up chassis, however, a pair of bearers, cut from 2in. by $2\frac{1}{2}$in. wood, and shown at (A) in Fig. 1, should be prepared. These are to be bolted to the floor of the body in the right position to suit the springs attached to the wheels.

CUTTING LIST

Side frames (4)—$\frac{7}{8}$in. by 2ins. by 5ft.
Side frames (8)—$\frac{7}{8}$in. by 2ins. by 1ft. 9ins.
End frames (4)—$\frac{7}{8}$in. by 2ins. by 3ft.
End frames (6)—$\frac{7}{8}$in. by 2ins. by 1ft. 9ins.
Bearers (A) (2)—2ins. by $2\frac{1}{2}$ins. by 5ft.
Flooring—$\frac{7}{8}$in. by $4\frac{1}{2}$ins. boarding, tongued and grooved, 50ft. run
$\frac{1}{2}$in. by $1\frac{1}{2}$ins. planed slip, 14ft. run
$\frac{3}{8}$in. by 2ins. planed slip, 10ft. run
Plywood or substitute board, according to size of sheets available. Bedding from spare wood

Chassis

The complete chassis, already mentioned, includes wheels and springs, with a frame attached to them on which the body can be screwed, also towing bar and mudguards. As bought new the whole affair may be too much for many a reader's pocket, but a second-hand one can often be picked up through the advertisement columns.

Failing this, about the best plan is to buy a pair of second-hand wheels, of 24ins. to 30ins. diameter, a pair of moderately light springs to accompany them, and fix the springs to the axle in the usual manner.

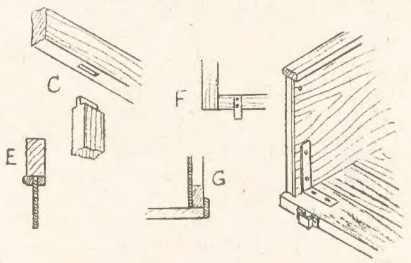


Fig. 4—Fittings for the back

A suitable axle might be made locally, or ordered from any firm doing such work. If the axle is to be made to order, then have it the right length for the wheels so that they clear the body of the trailer satisfactorily.

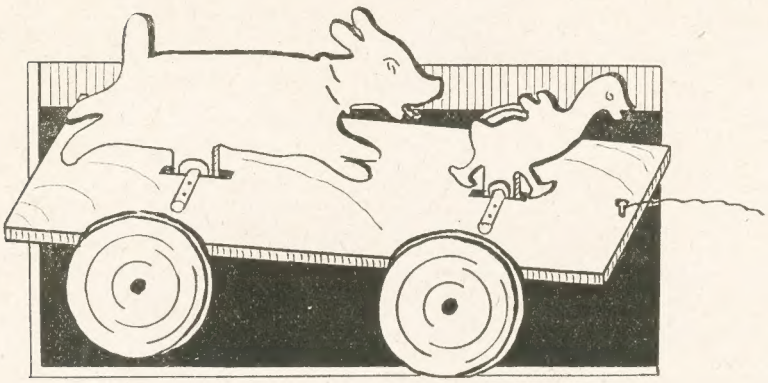
Tow Bar

Underneath the body a length of angle iron can be bolted, as a tow bar, allowing it to extend beyond the body some 30ins. or so, enough to allow the trailer to swing round without knocking against the car. A steel link on the end of the bar can be fitted to engage in a suitable fitting attached to the rear of the car. A complete tow bar and fitting can be purchased if preferred.

The body should be varnished or painted for protection against the weather, and a tarpaulin cover provided for the same reason. Mudguards would make a valuable addition and, of course, the usual rear lamp and number plate should be added.

Full-size Patterns on page 79 for this mechanical

DOG AND DUCK TOY



THE novel pull-along toy illustrated will be welcomed by any small child. As the toy is pulled along the Dog and Duck move backwards and forwards in an amusing manner.

Full size patterns for the cut-out dog and duck, and the other small pieces, are given on page 79 in this issue. In addition to a piece of wood to take these, the only other material needed is a piece about 13ins. by 4ins. for the base and some odd pieces for the four spindle-supports; 2ft. of ½in. dowelling, and four wheels of 3in. diameter, which may be obtained from Hobbies Ltd.

Plywood makes the strongest job, if available, or alternatively sound box-wood will do quite well. The measurements given allow for wood of ¼in. thickness being used but the exact thickness is not important as long as it can be cut with the fretsaw, and the measurements can easily be adjusted to suit it. The dowelling, too, need not, of course, be exactly ½in. diameter, but if any other size is chosen, the various pieces that fit the dowel must be varied accordingly.

The principle of the toy will be readily seen from the sketches. The base has four pieces let into it at the sides, to carry the two spindles cut from dowel. The wheels are glued to these spindles, and in the centre of each spindle is a small eccentric wheel, marked (A), which at its highest point pushes against extension pieces on the cut-out dog and duck.

The dog and duck themselves are held loosely on to other pieces of dowel screwed to the top side of the base board, and the extension piece on each figure projects through a slit in the base immediately over these eccentric wheels.

The figures are so balanced that they tip forward on to their front legs, when at rest, and as the eccentrics revolve, the dog and duck are tipped slightly backwards and then allowed to fall forward.

Cutting Out

Paste the full size patterns on to a piece of wood, and on another piece draw out the base and side pieces as at Fig. 1. It will be seen that there are quite a number of holes of ½in. diameter to be cut out, and it is a good plan to cut all these out first. Although these can easily be done with the fretsaw, a quicker and even better job is made with a brace and ½in. bit.

When boring thin wood, however, one must, of course, remember to turn the part over as soon as the point of the bit is through, and (placing the bit in the same hole) describe a circle on the back of the wood. If the wood is then turned back on to its face again and the boring completed, the piece comes out, leaving good clean edges on both sides of the wood, and the hole will be exactly right for the ½in. dowels.

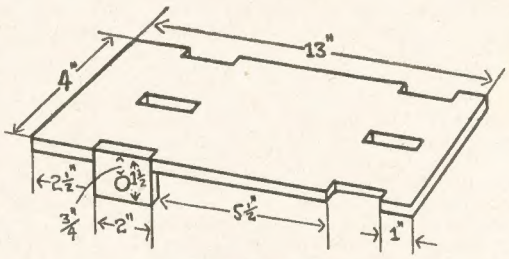


Fig. 1—Dimensions of the base

The holes in the pieces marked (B) (which are glued to the two dowels on which the dog and duck swing, to hold the latter in place) are much easier to cut out in this way.

Assembly

When all the pieces are cut and glasspapered, the assembly can begin. Glue or screw the four spindle supports to the base, and cut two pieces of dowel about 6½ins. long for the spindles. It is better to leave these a little longer than is necessary and then trim them to the exact size later on. Glue the eccentrics in position exactly in the middle of these spindles, and set aside to dry.

Cut two more pieces of dowel each 2½ins. long, push on the two cut-out figures, and glasspaper the holes until the figures swing easily on the dowels. Make sure that the slits in the base are wide enough for the dog and duck to move easily in them, whatever thickness of wood may be used.

Next screw the dowels, with figures on them, down on to the base, with the projecting pieces on dog and duck extending through the slits in the base provided for them. Glue on to the dowels the four pieces marked (B), one on each side of the figures. These should almost, but not quite, touch the cut-out figures, to hold them in position but allow them freedom to move backwards and forwards.

Fix the wheel spindles, with the eccentrics on them, into the supports temporarily, and try out the eccentrics. The eccentrics at their highest points should just tilt the figures backwards a little, and then release them again when the lower portion of the eccentric comes into position (see Fig. 2).

When putting in these spindles care must be taken to ensure that they go in with the eccentrics the right way round. So, when the toy is pulled forward, the eccentrics reach their highest point gradually, and then drop to their lowest. This ensures a smoother backward-and-forward movement of the cut-out figures. A little glasspapering may be necessary to ensure that they only push the dog and duck back a little, and are not tight enough to bind as the wheels go round.

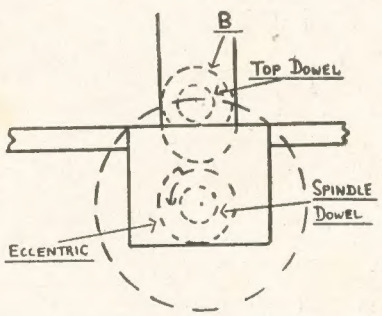


Fig. 2—The action of the discs

The Wheels

See the spindles turn smoothly in their supporting pieces on the base. Then bore out the wheels as necessary to take the ½in. dowel and glue them squarely on to the spindles, first adding the small discs (marked C) between base and wheel in each case, to prevent the wheels from rubbing on the side supports.

Finish off the toy in bright enamels or paint, and add a ringed screw at the front, on which to tie the string for pulling along. (127)

The use of Perspex in making attractive
ILLUMINATED SIGNS

GOING hand in hand with ordinary Perspex signs, the construction of which was described in a previous issue of Hobbies Weekly, are those which are utilised for both day and night display. Here the methods employed to make the display units themselves are similar to those used on day signs but several new 'tricks of the trade' are introduced, plus a cunning system of simple lighting. To give the craftsman a wide scope for developing his own ideas, only suggestions and working principles are given here.

Direct Lighting—Jigged Letters

In the example indicated in Fig. 1, the

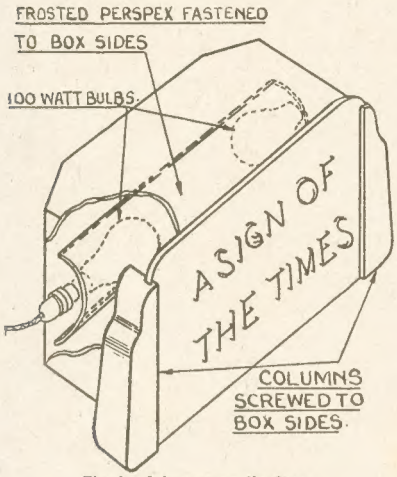


Fig. 1—A box type display

display plate consists of a sheet of $\frac{1}{16}$in. or $\frac{1}{8}$in. (maximum) opal Perspex on which the required letters are cemented. The latter should be fretted out from clear (i.e., transparent) $\frac{1}{16}$in. thick sheet Perspex. Opal is used for the backplate because, although having an attractive dense white appearance, it will allow light to pass through, thus illuminating the coloured letters.

Made Interchangeable

The plate can be made to fit in slots (for interchangeability with other signs) in ornamental side pieces, either made from Perspex, wood, or polished metal. These side pieces are fastened to the light box. The latter can be made from scrap ply, thick card, sheet metal, or black Perspex.

Illumination is provided by using either two 100-watt bulbs or fluorescent strip light. If bulbs are used it will be necessary to fit a further sheet of Perspex between the bulbs and the back of the display plate to diffuse the light. This sheet will be frosted (standard) $\frac{1}{8}$in. thick and can be fitted either flat or curved round the bulbs.

Shaping is done by heating the material, as described in the earlier article, and holding it with tape round a large dowel or other suitable object until cool.

Direct Lighting

Where letters built up from strip are required on the sign plate, a similar lighting unit can be used. The edges of the letters themselves, however, should be directly exposed to the light to provide a good effect. The effect is, indeed, most attractive with this arrangement, the light passing through the letters giving them a 'liquid' effect.

To expose the letters it is necessary they should be fixed in the front plate with their edges, which must be polished, lying flush with the rear surface of the display plate. To do this, the shape and size of the letters must be arranged as required on the opal Perspex (using a very sharp pencil). After which they are fretted out, taking special note that it is the plate and not the letters cut away that is required.

Finishing and Fitting

The plate is then finished by filing carefully down to the fine lines with small toolmaker's files. This is then fixed to a clear (colourless) sheet of Perspex $\frac{1}{8}$in. thick and the same size as the opal by using cement round the edges. The insides of letters such as O, P, R, etc., will then have to be cut and cemented on the clear panel in their appropriate positions.

When set, the really tricky work starts. Lengths of clear coloured Perspex strips, the edges of which have been polished previously, are cut to fit the grooves formed in the opal plate. It will be seen that if the strips are cut from $\frac{1}{8}$in. sheet and fitted edge down, the width of the grooves, i.e., the width of the letter strokes, must be very little bigger than $\frac{1}{8}$in. to provide a snug fit for the strips.

Instead of having an opal Perspex front plate, sheet metal or plywood may be used. Here, of course, only the letters will be illuminated.

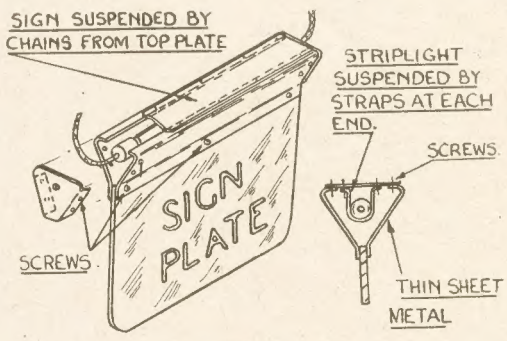


Fig. 2—A strip lighted word panel

Edge Lit Signs

For simplicity and effectiveness these are the best night signs considering the quite small outlay. All that is involved, as seen from Fig. 2, is a simple light box fabricated from sheet metal, wood, card or Perspex. A slot $\frac{1}{4}$in. wide is provided in the casing. This is to accommodate the sign plate which must be made from clear Perspex.

The letters that make up the sign are not, in this case, cut from separate material but are marked on the surface of the Perspex plate itself. If an engraving machine (hand type is admirable) is available, this operation is simplified. Otherwise the marking will have to be done by hand with a scriber or other sharp-pointed tool. In either case, the result will be a roughened (matt) surface to the letters.

The depth of the marking is not vital but the matt finish is. The reason for this, which provides the working principle of the sign, is that the light shining from the polished edge of the plate is refracted at right angles by the roughened surface—thus showing up just the letters with a bright luminous effect.

Colours

If colourless Perspex is used, the letters will show up silver. On the other hand if the edge of the sign in the light box is fitted with a thin strip of clear coloured Perspex (about $\frac{1}{8}$in. thick and polished), then the letters will glow that colour. This is fascinating, since the strip and light will be out of sight.

The light box itself can be made from sheet brass and afterwards chromium plated. Alternatively, opaque coloured Perspex may be used, thus giving an additional attractiveness to the sign at night. The light should be the strip type (preferably) and connections taken either through the back or the ends.

The type indicated in the sketch is intended for suspension, but the reverse is equally effective, especially if a fancy base is evolved.

It should be borne in mind that letters built up from clear strip and cemented directly over the marks in the plate will also be illuminated, but not with the same brilliance as those lit directly from behind.

Perspex is now more easily obtainable and there are many advertisers who can supply it. We have also had previous articles in these pages on how to use it, or, there is a number of books on the subject of interest to those who are proposing to undertake the hobby.

For shed, garage or workshop the amateur can lay

A CONCRETE FLOOR

WHEN a garden shed, workshop or garage is to be erected, it is important the foundation on which the structure stands is sufficiently firm to prevent subsidence at some later date. A concrete floor, well laid, will form a good foundation, and in these days of timber shortage it will also prove more economical than laying a wooden floor. Generally, this type of structure is erected on soft garden soil, therefore, under these circumstances, it is essential that the job is done thoroughly, otherwise, the floor will eventually crack with subsequent uneven sinking.

Preparing the Site

If the ground is soft it will be necessary to remove the top soil to a depth of 10ins. First, mark the four corners of the site by driving in four wooden pegs.

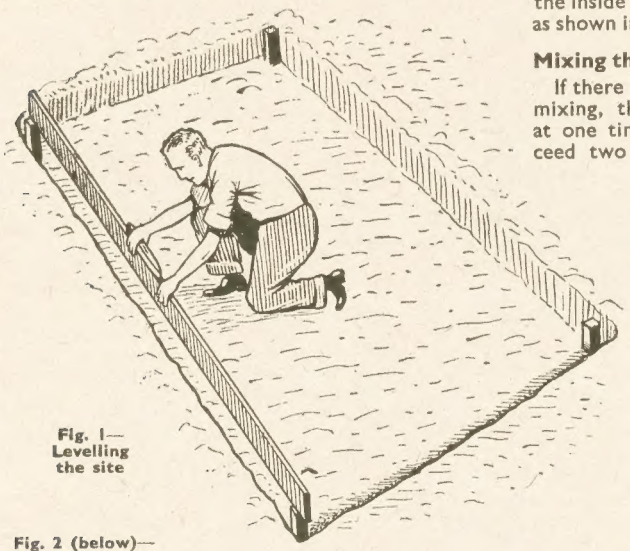
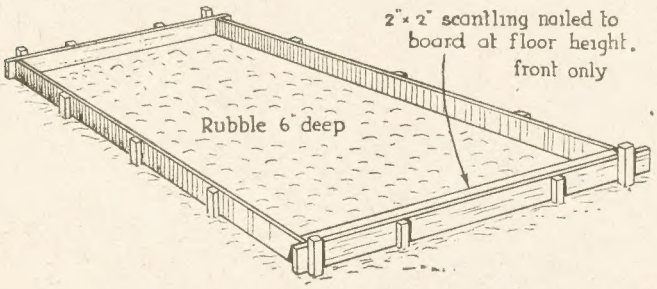


Fig. 1—Levelling the site

Fig. 2 (below)—Site ready for concrete



Then, using a selected piece of timber as a straight-edge, together with a spirit level, check the height of the pegs as shown in Fig. 1. The pegs should be driven in all to the same height, and the soil removed so that the same length of peg is showing. The height of the pegs should be several inches above that of the finished floor.

The clearing should then be filled with a quantity of ashes or broken bricks to a depth of 6ins., leaving 4ins. for the concrete. Next, join the four corner pegs with string, and drive in several pegs parallel with the string on each side and 1in. from the site boundary.

Checking Levels

These pegs should be driven in to the required level of the finished floor, each peg being checked against the other with the straight-edge and spirit level. Nail 4in. by 1in. boards to the inside of the pegs, forming a frame into which the concrete is poured.

If the floor is for a garage, provision must be made for the garage cross member to be let in level with the floor. This is done by nailing a scantling, of similar size to the one on the garage, to the inside of the front board, as shown in Fig. 2.

Mixing the Concrete

If there is only one person mixing, the amount mixed at one time should not exceed two to three barrow-loads, otherwise the job will be very laborious. The mixing should be carried out on a mixing board not less than 3ft. 6ins. square, formed by 1in. thick boards nailed to battens. If a concrete drive is available, this serves just as well.

A suitable mixture can be made up of one part cement, two parts sand, and four parts aggregate. The material called aggregate may consist of coarse gravel, broken bricks or clean stones. The sand should be clean and sharp, and free from impurities such as soil and mud. The amount of material required for any particular site can be worked out roughly on the assumption that a ton of dry mixture is approximately 1 cubic yard.

Mix all the ingredients together, first in a dry state until the cement is well distributed and the mixture is a uniform grey colour. Hollow the heap in the centre and add water in small quantities through the rose of a watering can, the heap being turned over and water added alternately until the

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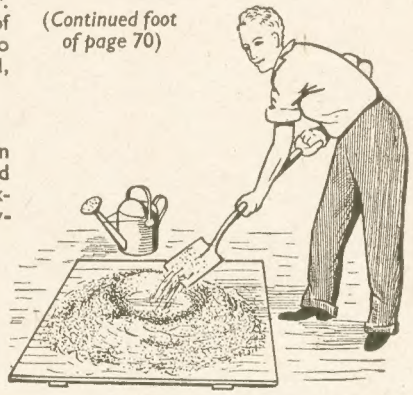


Fig. 3—How to mix the concrete

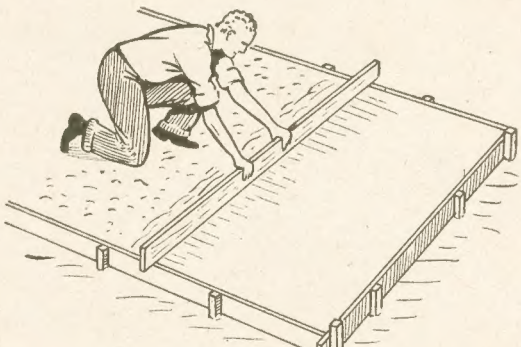


Fig. 4—The board levelling the concrete

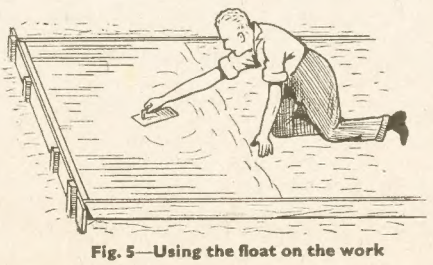


Fig. 5—Using the float on the work

Interesting experiments in crystallisation to make CHEMICAL GARDENS

A READER has written to enquire about 'chemical gardens', and as the subject is of wide interest, we have prepared this special article for all to read. None of the experiments calls for uranium, plutonium or other rare and expensive chemicals and all are quite safe if common-sense precautions are taken.

It is because some fellows mix, at random, various chemicals 'to see what happens', and because they try to make fireworks, etc., in garden sheds . . . sometimes with disastrous results, many chemists will not sell chemicals to boys.

We give several formulas, partly so that interested readers can try them all, and partly so that if readers cannot get the chemicals for one, they may be luckier with others.

Chemical Seeds

Mix six parts *by weight* of copper sulphate, one of iron sulphate, one of cobalt chloride, six of manganese sulphate and four of plaster of paris. Add just enough water to make a stiff paste and from this make 'seeds' about the size of an ordinary bean. Leave to dry thoroughly.

Now into a glass jug, goldfish bowl or jam jar, put up to 2ozs. of waterglass (silicate of soda), such as is sold for preserving eggs, and add water. When the waterglass has had a chance to dissolve, drop one of the 'seeds' in. As in all 'chemical garden' tricks, the jar must be placed where it will not be disturbed, but where it can be admired. Any attempts to move the jar results in the chemical 'plant' collapsing.

In the present case, a tree-like sprout will form on the seed and continue to grow in different colours. One must give the 'seed' time to grow, of course.

A Group of Crystals

This is somewhat on the same lines as the foregoing. Take equal parts of alum, copper sulphate, iron sulphate, magnesium sulphate (Epsom salts), sulphate of potash, sodium carbonate (washing soda) and zinc sulphate (white vitriol). Dissolve them separately (in water) in separate vessels, using just enough water to dissolve.

Then pour all the solutions into one large transparent vessel, such as a large glass jug. As the water evaporates, the crystals will shoot up in a most beautiful manner. The fellow who wants to entertain his friends with chemical displays will, no doubt, arrange an electric light behind the crystals.

Alum Baskets

Disolve, in hot water, as much alum as it will take up—about 1lb. of alum to a quart of water. If desired, a few crystals of copper sulphate can be added to turn the mixture blue, or a few crystals of iron sulphate will turn it green. Chrome alum has its own special self-colour. The mixture must then be filtered through filter paper in a funnel, into a large china bowl.

Dip in such things as toy wicker-work baskets, reeds, rushes, split wood, mascots made of wool or anything of a slightly rough porous nature. (Smooth articles will not do). The articles should have a piece of cotton attached, so that after the articles are dipped, they can be hung up to dry.

When the water dries out, the basket, etc., will be covered all over with jewel-like crystals.

A variation of this is to make up a strong alum solution. Evaporate it, and from the crystals that form, select one that has an attractive shape. Tie it to the end of a cotton, and suspend it in another solution of alum. The crystal will continue to grow.

Care must be taken to remove any other crystals that may start growing on the cotton, or any irregular offshoots on the main crystal.

The Camphor Tree

If you can get any ethyl alcohol ('spirits of wine'), dissolve some camphor in it until it will take no more. Then pour some of the solution into a cold glass (either from a refrigerator or one left outside in the cold). The camphor will instantly crystallize into beautiful tree-like forms.

Similarly, those fellows who happen to have a microscope will find that if they make up a solution of chloride of ammonia (sal-ammoniac) and apply a fine film of it to a perfectly clean glass slide, they can watch the tree-like branching as the crystals form. Under science laboratory conditions, this can be projected on to a screen, and is very fascinating to watch.

There are scores of other formulas, but we have excluded those which call for poisonous chemicals (such as lead acetate) or those which readers will have difficulty in getting. The basic formula for 'chemical gardens' is that given under 'Chemical Seeds'.

If an object is suspended in a solution of a chemical capable of crystallising (as in the alum crystal experiment described), the crystals will form only on rough porous surfaces. Thus if we take a *glass* rod and attach some strands of wool to it, somewhat after the manner of branches on a tree, and dip this in a solution of, say, copper sulphate, crystals will form on the wool but not on the rod.

Concrete Floor—(*Continued from page 69*)

mixture is in a semi-fluid state, see Fig. 3.

The mixture is then carried to one end of the site and laid to a level slightly above that of the frame, taking care to work it well down at the corners and edges with a shovel or spade. When a strip of 2ft. or 3ft. is filled in, 'float' the surface with the edge of a board, as shown in Fig. 4.

If the concrete is evenly knocked down with the edge of the board, the fine mixture will work to the top, leaving a smooth finish which can be run off level with the top of the frame. Later when the surplus water has drained away, the surface can be still further smoothed with a metal hand float, see Fig. 5.

Continue mixing and laying until the site is finished. It must then be protected against heavy rain, frost, cats and dogs. This can be done by covering with sacks or matting supported on bean sticks or scantlings. In the absence of frost or hot sun, the covering can be removed in 24 hours.

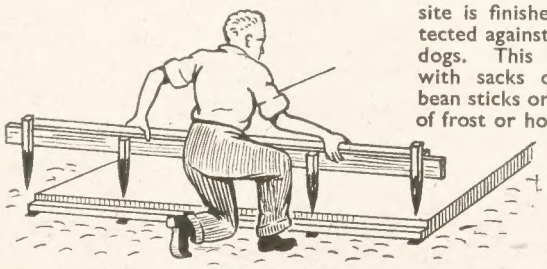


Fig. 6—Removing the framework finally

If frost or sun prevails, the covering should be left on for at least 48 hours. After this the framework can be removed, see Fig. 6, but the surface should not be walked on for several days. The whole lot should then be quite solid and stand up to constant use without cracking.

Add to the garden beauty and usefulness by building a GARDEN SUNDIAL

MAKING a sundial, such as shown in our illustration at Fig. 1, is a most interesting job, and the materials required for it can be obtained very cheaply. Looking at Fig. 2 we see a view of one of the sides, giving the arrangement or 'bond' of the bricks, together with the height of the pedestal. The whole should be set on a layer of concrete about 3ins. or 4ins. thick, made square or circular in shape.

The whole thing may be made from old bricks, providing they are whole and in good condition and free from cracks and broken edges. New bricks, perhaps, would be preferable, as there would not be any cleaning off of old mortar as when old bricks are re-used.

Number of Bricks Needed

If the pedestal, its base and its capping are made to the dimensions and planning shown, then sixty-eight to seventy whole bricks will be found sufficient for the whole job. Some cement and sand will be wanted, and even if the worker has never used a trowel and cement before, he should not find the jointing and building up at all difficult.

Having made the concrete base and given time for it to harden thoroughly, the first course of the brick base can be laid. It should here be mentioned that the top surface of the concrete must be properly levelled and tested with a long spline and spirit level.

The Cement Mortar

For cementing the joints of the bricks, etc., a good mortar may be made by mixing one part cement to two parts of sand. On a piece of board or platform spread out the cement and sand and mix thoroughly together in the dry state. Then, with the watering can, add the water until the mixture is a thickish paste. Take the precaution to add the water gradually so as not to make a 'sloppy' mortar.

Keep turning over the mixture until all is thoroughly wet and of an even moisture. Decide on the actual direction of the pedestal and set out a square of approximately 22½ins. This is for the lower member of the base as (A) in Fig. 2 and Fig. 3.

Next set aside twelve bricks, sprinkle them with water and commence straight away to lay them on a bed of cement mortar spread evenly on top of the concrete. Fill in the centre if desired with a bat or half brick, and trowel up the joints evenly about ½in. thick. Clean off any excess mortar and with the tip of the trowel make smooth and even the actual outside joints.

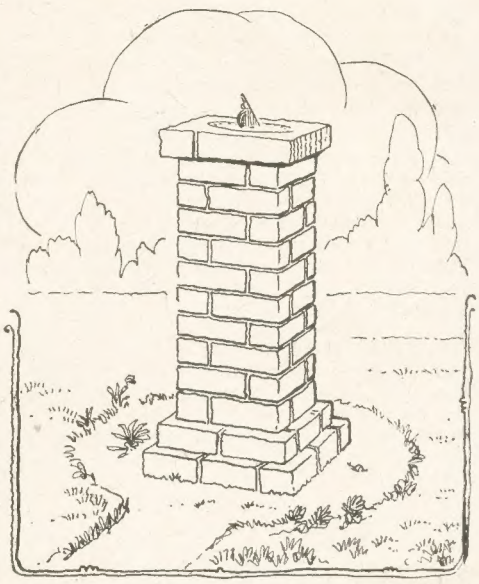


Fig. 1—The completed garden ornament

Upper Base

This completes base (A), which is topped by the second layer, course (B). This course is two bricks square, that is approximately 18ins. across. Lay a good bed of cement mortar again and repeat the bonding, following that shown at (B) in Fig. 2. Eight bricks will be wanted here, and care must be taken to keep an even margin all round on layer (A).

Always remember to wet the bricks prior to laying them in the cement. If this is not done the porous nature of the bricks will not allow the cement to adhere properly. This means, the bricks absorb the moisture from the mortar before the latter can penetrate the pores of the bricks.

Now for the actual pedestal which is ten courses of bricks high, or about 2ft. 6ins. Four bricks are required here for each course and plan (C) in Fig. 3 shows the arrangement of the bricks. Note now that the arrangement of each course is the same, but every other course is turned, so that what is the face of one course, the next is at the side. This is more easily explained by the perspective view Fig. 4.

The hollow space in the middle of the pedestal could, if desired, be filled all the way up with half bricks laid and cemented in as each course is completed. Great care must be taken to get the sides perfectly upright, and to assure this being done a plumb-line (see Fig. 5) should be used.

A Plumb Line

The amateur bricklayer could easily make one of these himself from a strip of board about 2ft. long and 3ins. wide by about ½in. thick. At one end of the piece cut a hole with the fretsaw to allow a metal 'bob' to rest comfortably in as shown. Then at the upper end, and exactly central in the board, drive in a screw round which a piece of cord is wound. The string ('S' in the sketch), will hang down and support the weight below.

It will be seen that as the pedestal is erected course by course the plumb-bob is held against the brickwork and a check made, noting how the string and weight hangs in relation to the hole in the board. Flush up or 'point' the courses of brickwork neatly and then finish the top of the pedestal with a capping course as (D) in Fig. 2. This capping is simply a repetition of the course (B) at the bottom of the pedestal.

It only remains now to obtain a

(Continued foot of page 72)

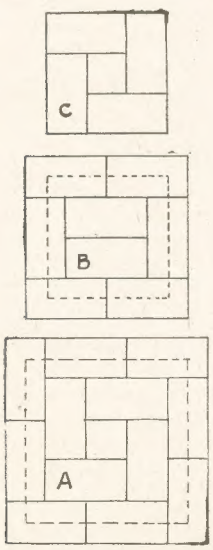


Fig. 3 — Showing the brick courses in the pedestal

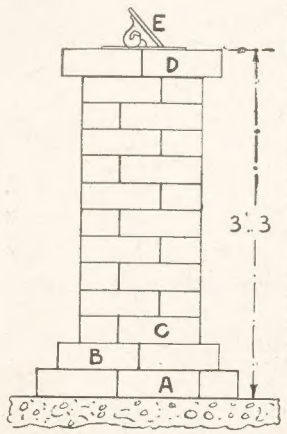


Fig. 2—Side view with base and dial

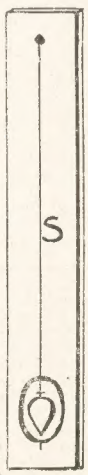


Fig. 5—A line

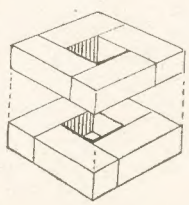


Fig. 4 — Locking courses

More addition to our earlier novelties about
BOTTLE MYSTERIES

IN our issue of December 14th, we described a method of accomplishing the curious result shown in Fig. 1—a nail or short bar inserted through a cork at a point inside the bottle. One of our readers, Mr. T. E. Parr of St. Helens, Lancs., has written to describe another, and perhaps, simpler method. As will be seen from Fig. 2, the cork, glasspapered down to pass easily, though not shakily, through the neck of the bottle, is impaled on the end of a long knitting needle. The cork has a hole for the nail already bored through.

Fixing the Nail

The nail is placed in the bottle and a wire with a loop at the end may be used, if necessary, to coax the end of the nail into the hole in the cork. The loop in the wire should pass easily over the head of the nail.

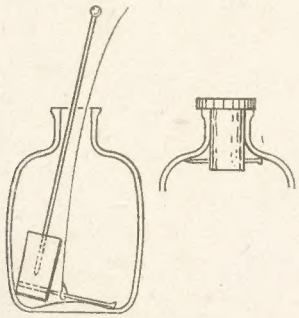


Fig. 2—How to fix the nail

Once the nail is fairly in, the cork may be swung over by means of the knitting needle and the nail centred. The wire with a loop, if used at all, is now withdrawn and the cork hauled up. A little colourless rubber cement smeared on the inside bottle neck, just prior to raising the cork, is an advantage, especially if it is desired to glue on a metal cap as shown in Fig. 3. This cap, however, is not really necessary. Plenty of sealing wax may be used instead.

It is important to note that the cork to be used will be longer than that normally used for the bottle in question. The nail passes through just where the neck ends and, of course, there must be some cork below this.

By the method shown in Fig. 2, a longer nail than that used in the method

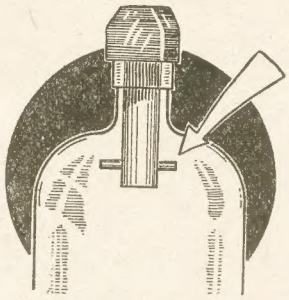


Fig. 1—How did the bar get there?

of Fig. 1 may be employed. Instead of a cork, a wooden stopper may be used. Instead of a knitting needle, a gimlet blade brazed to the end of a thin rod can be used.

A Bulb Mystery

Mr. Parr also mentions another novelty, not quite so mysterious as the one just described, and not a match for the celebrated Ship In The Bottle (already described in our pages) but, nevertheless, quite interesting. The idea is to get one of those plastic animals, etc., ornaments, of the type illustrated, and to place it in an electric light bulb. The 'classical' horse illustrated is a good type of ornament to use, but there are other animal shapes and also ship designs. They cost about fourpence each and are obtainable at the usual stores.

First twist off the brass cap of the bulb and extract the filament. Each model will require its own special treatment but in the type shown, the finest available fretsaw blade is used to cut off the legs at (A) and (B); the mane at (D) and the neck at (C). It will be found that the design follows these lines. Naturally, the idea is to get the largest possible model inside the bulb and with the fewest cuts.

Inside Fixing

The model is re-erected in the bulb, using plastic cement. Naturally, great care is needed to obtain accurate results. Take care not to use too much cement, as otherwise it will ooze out and immediately betray the secret. If well done, it is very difficult to see the join.

To manipulate the parts, long tweezers may be made from two halves of old hacksaw blades as shown in the sketch. It is best to play for safety and join one part to another at a time, allowing to set.

Hacksaw Tweezers

As will be seen from the diagram, the two halves of the hacksaw blade are joined with a rivet after being spaced with a washer. The ends are ground to the shape shown. The holes for joining will, of course, be the holes already in the hacksaw blade. The sketches show (top) a plan view and (below) a side elevation.

When the model is finally assembled, it should be raised to the top of the bulb (the bulb looked at sideways, as illustrated). With a long spoon, apply some liquid plaster of paris to the bottom of the bulb. Take very great

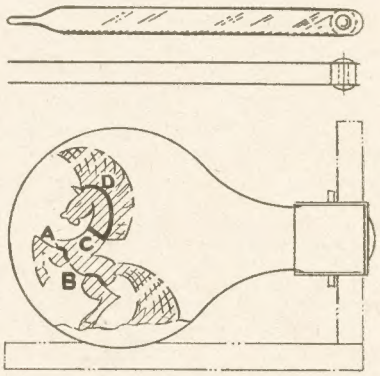


Fig. 3—A figure in the bulb, with tweezer detail

care not to spill any where not wanted, as it is almost impossible to clean up afterwards.

With the tweezers, etc., place the model in position in the plaster and hold it until the plaster sets. The brass cap of the bulb is replaced by plaster.

Readers may have varying ideas on how to display the bulb. One good way would be to join two pieces of wood, about 3ins. wide at right angles, something after the style of a book end. The vertical part would have a hole bored through, exactly the same size as the neck of the bulb. In fact, it should be a reasonably tight fit here. The flat part could have a shallow depression scooped to hold the bulb where it touches. The stand should be nicely made and polished. (126)

Sundial—(*Continued from page 71*)

suitable sundial consisting of a circular plate of brass, having fixed to its centre the 'gnomon' or upright which casts the shadow across the plate while the sun shines, see (E) Fig. 2.

It will be understood that the plate must be correctly placed on the capping, the twelve o'clock marking being put north and checked when the sun is shining. Small blocks of wood should be let into and cemented in holes drilled in the brickwork. These holes can be made with a Rawlplug jumper or other suitable tool. Lightly drive in a small wire nail into each block of wood exactly where the holes come in the brass plate.

Then cover the whole top of the capping with a ¼in. or more layer of cement and slightly bed in the plate, keeping the holes of same exactly over the nails previously put in. When all is set, insert two round-head screws.

As an alternative suggestion the pedestal could quite well be topped with a cement bird bath or one of the many cement modelled ornaments seen in garden shops. One of the principal points is to have a good foundation, so the ground does not sink and cause the whole thing to lean over.

An experienced craftsman gives you a lot of hints

ABOUT MAINSPRINGS

IT is rather alarming to think what we should do without mainsprings. They form the motive power of all our watches, for most of our clocks, and a large number of gramophones, musical boxes and recording instruments. All clockwork toys would be absolutely helpless without mainsprings, while in industry the demand is enormous.

There are the time switches, factory time recorders and a whole host of scientific instruments, all of which rely on the modest mainspring to keep them going.

With all this popularity for mainsprings it is only fitting, therefore, that the handyman should know something about them. With a knowledge of their habits and peculiarities, how to repair them, and the correct fitting and adjustment of new ones, a keen handyman should have quite a busy time.

Special Steel

Because a mainspring is made of steel many people are inclined to treat it rather roughly. Instead of which it is a somewhat delicate and fragile piece of mechanism. Special steel of a very high grade is used in its manufacture, and its shaping, hardening and tempering is a specialized job calling for a great deal of skill.

The majority of mainsprings in use today are fitted into a circular box or case of brass or steel which is known as the barrel. The outside end of the mainspring is secured to the barrel rim by means of a small catch or hook, while the inner end of the spring hooks on to a circular piece of steel called the barrel arbor, which is free to rotate in the barrel.

Necessary Dimensions

There is a correct width, thickness and length of mainspring for every job and special attention should be given to this when fitting a new spring. The width should be just sufficient to allow the spring a very little freedom when the barrel cover is snapped on. Not too tall to bind nor too narrow so it wobbles about when wound.

The length and thickness will govern the number of turns that a spring may be wound. The ideal mainspring occupies one third of the barrel area (see Fig. A), and the arbor should take up another third, thus leaving one third free. When wound up the mainspring will be as shown at (B). This, however, is not always the case and there are many barrels which owing to bad designing and bad fitting are far from the ideal.

Stress and Strain

Many people think that the longer the spring is the longer it will go. This is a great mistake, for if the mainspring takes up too much space in the barrel, there is no room left in which to wind it.

A mainspring should be just thick enough to be able to do the job allotted to it with comfort. An extra strong one will get over the work but the extra strain would cause the parts of the instrument to wear out very quickly and probably give a lot of trouble. Do not take any notice when someone tells you to 'put a good strong mainspring in it'.

Mainsprings are hooked into the barrels in quite a number of ways and it is important to pay special attention to this matter. Let us consider the barrel hookings first. The usual kind is that shown at (C), which is either screwed or riveted in, or it could be a combination of the two. It should be made of mild steel for the best work, although an iron nail will make a quite good hook if it is not an important job.

The shape of the barrel hook should be similar to the head of a countersunk screw so that the more pressure exerted by the spring the tighter it will grip the hook.

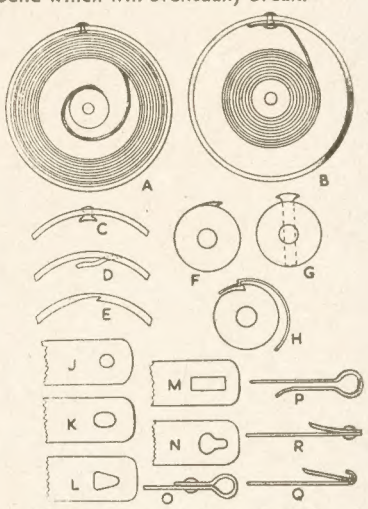
Holding Hooks

Some of the cheaper type barrels have a hook made by pressing out a portion of the actual barrel, as shown at (D). This is quite satisfactory while the hook holds, but, unfortunately, it is a weak spot and we generally find that after a time a break will occur here. The best method then is to drill a hole in another part of the barrel and fit a type (C) hook.

The diagram at (E) is yet another hook which deserves a mention, and is made by cutting a nick in the barrel rim. Its use, however, is mostly confined to watch work where there is not a lot of power employed.

The centre hooking, where the mainspring is attached to the barrel arbor calls for rather more care and consideration than the outer hook. It is generally in the first or second coils from the centre that a mainspring breaks, and a carefully made hook and well fitted spring can do much to avoid this disaster.

The hook in the arbor, while being sufficiently large to hold the spring secure should not protrude far, nor should it have any rough edges. It should be remembered that when a spring is being wound up tight the inner coils will be forced out of shape if the hook sticks out too far. In time this will weaken the spring here or start a nasty bend which will eventually break.



Various types and parts as mentioned

Fig. (F) shows the best hook of this type, which is employed in all first class watches, clocks and scientific instruments. The hook protrudes from the arbor just a fraction more than the thickness of the spring and, therefore, allows the next coil to lay flat on the first coil, thus forming the ideal hooking.

Gramophone Springs

The hook shown at Fig. (G) is designed to stand the considerable strain required in gramophones and such like instruments, but on account of the large portion that sticks through the spring it is a bad hook. Nearly every break in a spring employing this type of hook occurs in the first coil near the hook.

The ideal gramophone centre hooking and one that is becoming popular is the 'hub centre', shown at (H). A nick is cut in the arbor and the spring is shaped to fit snugly into this, thus allowing the following coils to lie flat.

Now we come to the very important problem of the correct manipulation of the steel in order to obtain a perfect mainspring hook. When a spring breaks, in nearly every case it is either near the outer end or near the inner end—very rarely does it occur in the middle.

Should the break be near the inner end there is only one thing to do and that is to fit a new spring, as it is almost im-

Cardiff Ship Models

SOME ship modellers of Cardiff are very keen to expand the membership of their club—the Cardiff and District Ship Model Society. They are very keen, and can produce many actual and interesting results of their energy. One, for instance, is a tiny model in an electric light bulb only 1in. in diameter. Readers in the district who are interested should contact the Secretary at the Glastonbury Arms Hotel, Bute Street, Cardiff.

possible to rehook it in a satisfactory manner. We must, therefore, confine our remarks to repairing the outer end and there are numerous ways of doing this.

Figs. (J to N) show some of the chief shapes of hooking eyes, the first three being those most used. (K and L) are used for the pushed-in type of barrel hook, shown at (D), while (N) is a very firm type much used in gramophones. The long rectangular eye (M) is a watch hooking and is very suitable for that purpose.

Detempering Steel

Mainsprings are made of specially hardened and tempered steel and it is useless trying to rehook them without first drawing the temper. To do this place the end of the spring in the flame of a spirit lamp or gas jet, withdrawing it when the steel turns blue. Some steels may be somewhat tough and will want heating rather more but that you will find out when you start working on the job.

It is quite an easy matter to punch a hole in the spring now that it is softer. Place the end of the spring on a block of lead and with a good punch held centrally over it give a smart tap with a hammer. This should result in a nice clean hole which can be brought to size and shape by filing—the spring being held securely in a vice. The end of the spring should be rounded somewhat and the rough edges removed with a file.

Punches

The same procedure is applied to the small and delicate watch springs, but a little extra care is needed: a blunt ended needle making an excellent punch for the job. When you have filed the hole to size and made sure that it will fit over the barrel hook, the spring should be well emery papered and made quite smooth.

Alarm clock mainsprings employ the hooking shown at (O) and (P) and it is a simple job to rehook one of these—withdraw the temper by heating, bend round a piece of metal while hot if possible and nip together with pliers.

(Q) and (R) are typical watch hooks, the first has the end turned over and a short oscillating bar of spring tucked in. (R) is very similar but has the bar riveted on to the end, making it a fixture.

Type of Oil

All mainsprings should be perfectly smooth so one coil will slide over another. To help them to do this easily some form of lubricant is necessary. For watches, just a spot of a highly refined thin oil is sufficient, while clocks can have a few drops of good machine oil. Heavy type springs such as gramophones need a good graphite grease which is not too thick.

It is a very good plan when you have finished using a gramophone or toy motor to let the spring run down. The mainspring will thus have a 'rest' period and will maintain its energy for a longer time. By remembering these points you can add life to your various spring mechanisms.

Another selection for a variety of jobs with SIMPLE HOME CEMENTS

Envelope Gum

THE trade gum used on envelope flaps is made up by dissolving finely powdered dextrine gum in cold water and diluting as necessary. Hot water must not be used for solution. This gum has a slight tendency to absorb moisture from the atmosphere, and thus envelopes so gummed should be stored in a dry place.

Cement and Filler for Iron Castings

ONE part of finely ground graphite or black-lead and 2 parts of sulphur (in flowers or block) are melted together in an iron ladle or tin lid. When the two are thoroughly amalgamated the mixture should be poured out on a stone slab to cool. To use the composition a sufficient quantity is broken up and placed in the blow-hole of the casting, when it is soldered in with a hot iron in the same manner as ordinary soldering is carried out. It is best to do the work out of doors as the sulphur fumes are exceptionally irritating to both eyes and throat.

Cementing Oil-stones in their Cases

WHITE lead should never be used for this purpose because it is taken up by the oil used on the stone and tends to harden on the under surface of the stone, thereby rendering it impossible for the latter to be turned over and the reverse side used. A mixture of hot glue and red lead in proportions such that a thick syrupy solution is formed, will never really harden nor enter too deeply into the open pores of the stone.

Non-cracking Glue

ORDINARY glue can be treated to stop the annoying cracking which appears when it is set hard by the addition of a little chloride of calcium whilst it is still in the fluid state in the glue-pot.

Preparing Liquid Gums

ORDINARY liquid 'gum' can easily and cheaply be made by purchasing dry gum arabic and carefully dissolving it in twice as much water—by weight. Gum made up in this way is infinitely cheaper than that purchased in small bottles, particularly if a large quantity is needed.

Gum dextrine may be used in the same proportions as those mentioned above, but a slightly larger amount of dextrine is needed to produce an adhesive with the same characteristics as those of gum arabic, and the solution is also usually of a darker colour than the latter gum.

In both the aforementioned gum solutions a few drops of carbolic acid should be added to prevent them going mouldy. No heat should be applied to hasten solution, as the adhesive qualities of the gums is thereby impaired.

'Roman' Cement

EQUAL quantities of clean clay, lime, and iron rust are separately heated till calcined, being then finely powdered and well mixed together. The cement should be kept in a tightly closed vessel and mixed to a paste with water when used.

Stone Cement and Artificial Marble Material

IN liquid chloride of zinc dissolve 3 per cent of either borax or chloride of ammonia (sal ammoniac); add oxide of zinc which has been previously heated to redness, until the mixture is of the proper consistence. This cement, when thoroughly hard is as firm as marble, and may, moreover, be cast into moulds like plaster of Paris. It is largely used in imitation marble mosaics.

Chlorine-proof Cement Lining

ONE part of best pitch and 1 part of rosin are separately melted down, and one poured into the other; then into the mixture 1 part of plaster of Paris is slowly stirred. The cement should be used in a medium stiff state. and laid on to the thickness of about $\frac{1}{8}$in.

Hydraulic Cement

THREE pounds of iron rust is stirred into 1lb. of boiled linseed oil, and the whole brought to the boil to form a stiff paste.

'Birdlime' Cement

TRUE 'birdlime' cement is made from the inner cortex of the holly, being taken from the tree in summertime. This is boiled with water till soft, the water is drained off and the pulp allowed to ferment; being finally ground in a mortar and kneaded well. It is kept under water till required.

An artificial 'birdlime' may be made up by boiling linseed oil for many hours, till it becomes really 'tacky' whilst yet another preparation consists of boiled linseed oil 3 parts, Venice turps 1oz., and castor oil 1oz. All these cements are much used for preventing belts slipping in workshops, as well as for 'banding' trees against the onslaughts of insects.

NEWFOUNDLAND PORTRAIT GALLERY

WHEN dealing with the stamps of Newfoundland some time ago we mentioned that this colony had the finest Royal Portrait gallery of any stamp-issuing area. Now we propose to discuss those stamps. We could do this either by taking each portrait stamp as it was issued (and this would give a very slipshod order), or we could describe each portrait (and this would make the article very long and somewhat like a catalogue).

King James I granted a Charter to Guy

King Edward VII when Prince of Wales

The Duke of Windsor when Prince of Wales

Actually we propose to mention the King, Queen or other member of royalty in their chronological order and give some idea why the portrait was produced.

As Newfoundland was our oldest Colony it is not surprising that we should have to turn the pages of history back many years to our first king. That was King Henry VII who was on the throne from 1485 to 1509, and his portrait comes on the 60c. of the 1897 issue.

Two Anniversaries

This date was the 400th anniversary of the discovery of Newfoundland by Jean Cabot, so that it was Henry VII who was on the throne and who gave permission for the expedition which found the island to set out.

The year 1897 was also the 60th anniversary of the accession of Queen Victoria, and the first stamp of the set shows her in her widow's weeds. Her husband, the Prince Consort, is on the 10c. stamp of the 1866 issue, but by mentioning him so soon we have left out a monarch, Queen Elizabeth, who was on the throne from 1558 to 1603. We have her portrait on one of the stamps of the set which came out in 1933—the Humphrey Gilbert set.

This commemorates the 350th anniversary of the annexation of the island by Sir Humphrey Gilbert. The stamps are dated 1583—1933.

In 1610 Newfoundland was settled and in 1910 a set of stamps came out to celebrate this, the 300th anniversary. The first illustration is the first stamp of this set and shows James I. It was he who granted a charter to Guy to enable him to go and settle there.

Kings and Dukes

Well, now we have to pick very carefully the stamps that we wish to mention because there are so many. The second illustration came out in 1880 and shows King Edward VII when he was the Prince of Wales.

Another Prince of Wales is shown on the ½c. stamp of the 1897 set. A very young child is given here — Prince Edward, now the Duke of Windsor. In 1928 he was again shown on the 4c. of that set, but the third illustration seems a very much better portrait. It shows the Duke in the uniform of the Welsh Guards, which is surely most suitable for the Prince of Wales.

Now if you were to take a piece of paper and write down the names of King Edward VII and Queen Alexandra, then below them King George V and Queen Mary, and again, below them, all their children, you would have what is called a genealogical tree and you would find the portraits of all these on the 1911 set, the Coronation set.

Queen Elizabeth appears on the 7c. value of the 1932 set when she was Duchess of York. Princess Elizabeth is shown on the 6c. of the 1932 set and then again on the 1938. Hers was the last portrait to appear—in 1947.

One cannot help feeling rather sorry that this Royal-stamp-issuing country will no longer give us these beautiful portraits.

NOW in addition to portraits, Newfoundland has issued some very good air stamps; good both from the point of view of value and also from the point of view of interest. Take the last illustration. It is the highest value, namely 1 $ (one dollar) of a set of three issued in 1931 for air postage.

The 15c. shows a dog team going over the snow with an aeroplane above. The 50c. has rather a long caption, which says 'Vickers Vimy leaving St. John's with first trans-Atlantic air mail passing over the first carrier of ocean mail', and this fully describes the design.

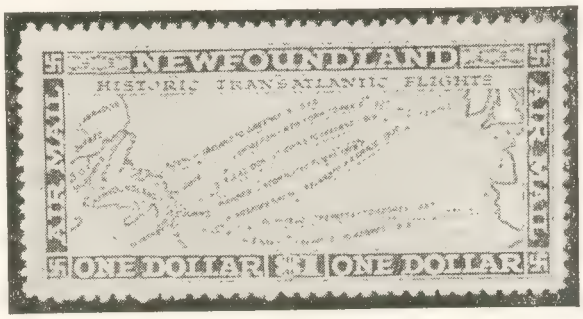
The illustration given here shows the routes of seven historic flights across the Atlantic. The first, which started in 1919, was never completed, and you can see the dotted line finishes in mid ocean. It was the flight of Hawker.

Just north of that route you can see another, dated 1919, and labelled 'Sir John Alcock—St. John's to Ireland'. That was with Sir A. W. Brown to win the Daily Mail £10,000 prize. Another 1919 flight is shown in the extreme south, the 'U.S. Navy Trepassy to Azores'.

Memorable Flight

Of the seven routes only two of them are from East to West and the reason for this was, of course, the prevailing wind. Koehl and Kingsford Smith were the two to go in the contrary direction.

Sir John Alcock's flight is further commemorated on the 15c. of the 1928 Publicity issue, a stamp which gives quite a good picture of 'The first airplane to cross the Atlantic non-stop'. Unfortunately some of the air stamps belonging to Newfoundland are expensive.



A stamp showing seven historic flights across the Atlantic

The map illustrated here is catalogued at £5, but a stamp actually used on letters taken by Alcock and Brown is priced at £15. A stamp used on letters carried by Hawker, although he did not get right across is up to £400. The stamps used on letters carried by De Pinedo in 1927 are £200, but unused specimens are up to £800. De Pinedo's route is shown lowest but one on the illustration.

Although this map is rather too expensive for many collectors, yet there are a number of map air stamps which give similar routes, but which are quite cheap. They make very interesting stamps to show, even to the person who knows nothing about stamp collecting.

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Concluding details for undertaking LEATHERWORK

IN our issue, dated April 12th, we gave helpful instructions and illustrations on how to undertake leatherwork—a hobby becoming increasingly popular. The instructions are continued and completed this week.

Rub lightly all over the design when the swab is almost empty of colour or the model may be obliterated. If the leather has been made dirty or greasy by handling too much, the stain will be very patchy. It is possible, though unorthodox, to wash the pieces with soap and water before staining. Again do not rub too hard or the surface will be bruised.

A very good polish can be produced by rubbing with another piece of leather, with a light brisk movement, while the leather is still wet. If the pieces are polished in this way as well as an extra stained piece for the thongs, no other polish is needed.

For a design in monochrome—e.g., the same colour but different portions lighter or darker—it is advisable to stain the background quickly a lightish tone and, with a paint brush, colour in the portions, such as borders and initials in darker tone. It will be necessary to have several jars with the dye mixed to various strengths to do this successfully. The painting can be done in exactly the same way as with water colours, by mixing and diluting to give the desired effect.

Punching

Heavy decorative work can be done by punching holes with a single or slit punch in a border or over a design and thonging with different coloured thongs. These punch holes should be carefully thought out and measured or the work will look very poor.

For thonged edges the preparation for punching must also be very careful. For beginners and general use, the holes should be $\frac{1}{4}$in. apart and $\frac{1}{8}$in. from the edge. A faint line can be ruled around the work to assist in keeping the punched holes straight and points can be pricked at distances of $\frac{1}{4}$in. with the edge tool to keep them even.

If the thonging is to join two pieces together, make sure that the holes correspond. As it is very difficult to punch two pieces at the same time without them slipping, one piece should be punched and the centre of the holes marked through with a pencil on the other piece which should be finished separately. To save the edges of the punch from becoming blunted very quickly, always place a piece of scrap leather under the piece to be punched.

Thonging

Thonging can be cut from a straight piece of leather slightly thinner than that used for the main pieces or to save material from a circular piece cut round and round from the edge to the centre. If coloured thongs are needed, the staining and polishing should be done first, in the above method.

Thongs may vary in width, according to the size of the article being made on method of thonging, but for the measurements already given for punching, the thongs should be $\frac{1}{8}$in. wide when stretched. It is possible to cut thongs with scissors, but a sharp knife gives a much better edge.

Stretching

After cutting thongs, damp them, and they will stretch out straight. The length of the thonging is determined by the article to be thonged. In an ordinary article, the thonging is about three times the length all round. In a large object, it is difficult to work with a large thong, therefore, you will have to join. It is difficult to join thongs with glue. However, the alternative method is to bind in the old end and the new in the same way as for starting.

Start thonging from a corner by pushing the pointed end of the thong through the first hole from back to front (or between the pieces, if two are to be joined together), leave about $\frac{1}{4}$in. at the back or between, and bind over this end with the next few stitches. Pull the thongs as tightly as possible towards yourself, and not upwards towards the edge or the holes may break.

The neatest type of thonging is that which lies close together, and covers the edge completely. The corners may be slightly rounded so that there is no break in the edging, or the corner hole may be thonged into twice, one stitch lying on each side of the point. To finish, pull the last three stitches loose with a tracer tool, and slip the end back under them. Pull each up tightly again with the tracer—pull the end, and cut off.

Various Methods

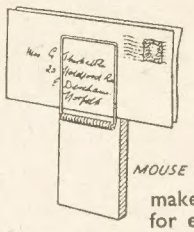
There are numerous methods of thonging which should be practised on scrap leather. Button-hole stitch thonging makes a stiffer edge. Cross-double thonging in two colours is very attractive. The holes are punched farther apart, one colour thonged slanting one way, and the other in the opposite direction to form crosses.

Threaded thonging must have perfectly evenly punched holes made with the slit punch. The thong is then threaded flat through the holes like ribbon, and does not go over the edge.

Thongs should be hammered flat when finished, and if the article has been stained, the edges of the thongs will need touching up with a paint brush. This will give a professional touch to the finished article.

Letter Holder

HERE is an idea for a simple letter rack. First secure an old mouse trap, and remove the catch so only the spring remains. The spring keeps the letters firmly in position if fixed to a board as shown, and if the holder is painted and screwed to the wall it makes an excellent article for everyday use.

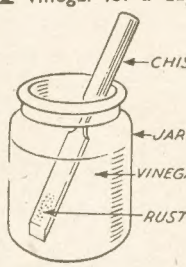


Pea Guards

IF you can obtain old bicycle wheels, they are ideal for pea guards in the garden. Half submerge the wheels in the ground (one at each end) and tie twine from one spoke to another to form a complete net.

For Rusty Tools

PUT the tool (say, a chisel) into a jar of vinegar for a day or two. Immerse rusty part only as shown in sketch, but do not put in the wooden handle or where it joins on the blade. Take tool out, wipe and dry; there will be no trace of rust.

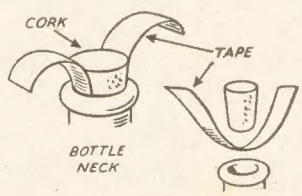


Wood Cleaner

TEA leaves make an excellent cleanser for varnished woodwork. Just soak them in water for half an hour, then strain the liquor off and use it for your cleanser.

Cork Extractor

IF tape is put around the cork as in the drawing, and then inserted, you will have a tight fitting cork. If you want to remove the cork, the only thing you have to do is to pull both ends of the tape, which should be left long enough for the purpose.



Cigarette End Insecticide

SAVE cigarette ends for making nicotine insecticide. When you have got them, put the ends in a jar of water. Place the jar in a saucepan of water and simmer for six hours. An ounce of ends may be diluted in order to make eight gallons of insecticide.

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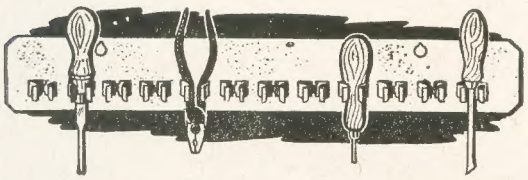

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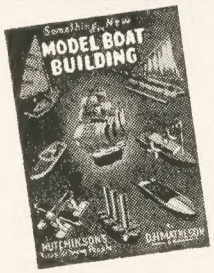

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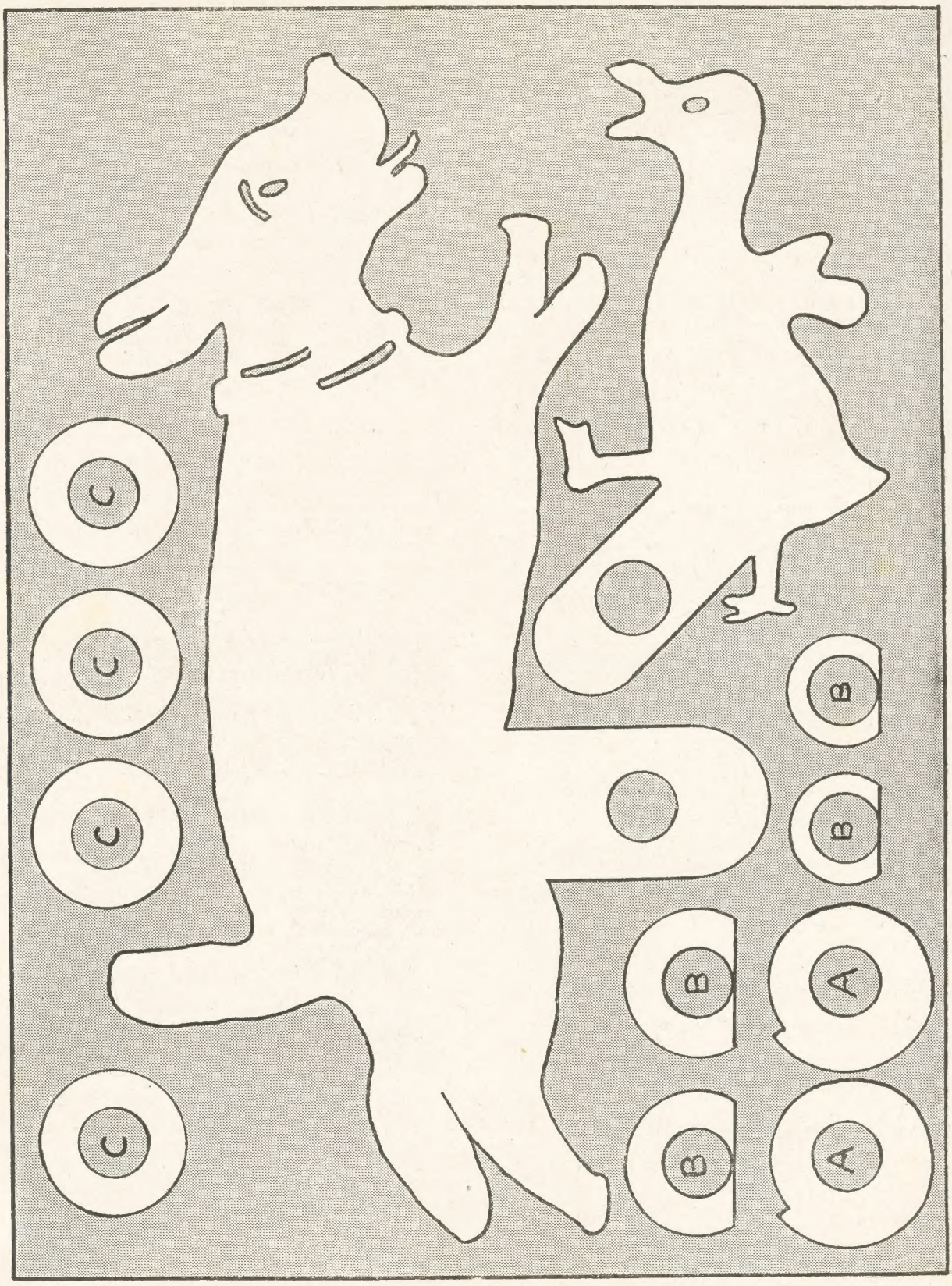

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